

CLAIMS

1. A coated cutting tool with a hard coating layer formed on a substrate, wherein the substrate comprises a binder phase comprising one or more kinds of iron-group metals and a hard phase comprising one or more kinds of substances selected from the group consisting of carbides, nitrides, and oxides of the periodic table IVa-, Va-, and VIa-group elements, and solid solutions thereof, and the coating layer comprises a smooth face having a surface roughness (Rmax) of $0.2\ \mu\text{m}$ or less (with a reference length of $5\ \mu\text{m}$) substantially at a blade-edge ridge, a range of at least $200\ \mu\text{m}$ from the rake face side boundary of the ridge toward the rake face side, and a range of at least $50\ \mu\text{m}$ from the flank side boundary of the ridge toward the flank side.
2. A coated cutting tool according to Claim 1, wherein the flank of the substrate has an as-sintered surface.
3. A coated cutting tool according to Claim 1 or 2, wherein the hard coating layer comprises one or more kinds of substances selected from the group consisting of carbides, nitrides, carbonitrides, borides, and oxides of one or more kinds of metal elements selected from the periodic table IVa, Va, VIa groups, Al, and Si, and solid solutions thereof.
4. A coated cutting tool according to Claim 3, wherein the hard coating layer comprises an inner layer comprising at least one or more layers of Ti ($\text{C}_w\text{B}_x\text{N}_y\text{O}_z$) (herein, $w+x+y+z=1$, $w,x,y,z\geq 0$), a middle layer comprising an aluminum oxide layer, and an outer layer comprising $\text{TiC}_x\text{N}_y\text{O}_{1-x-y}$ or $\text{ZrC}_x\text{N}_y\text{O}_{1-x-y}$ ($0\leq x,y$, $x+y\leq 1$).

5. A coated cutting tool according to any of Claims 1 through 4, wherein the smooth face comprises an aluminum oxide layer.

6. A coated cutting tool according to any of Claims 1 through 5, wherein the ranges of the smooth face are the blade-edge ridge, a range of at least 500 μ

5 m from the rake face side boundary of the ridge toward the rake face side and a range of at least 200 μ m from the flank side boundary of the ridge toward the flank side.

7. A coated cutting tool according to any of Claims 4 through 6, wherein the inner layer comprises titanium carbonitride with a film thickness of 2 to 20

10 μ m having a columnar crystal structure.

8. A coated cutting tool according to any of Claims 1 through 7, wherein an innermost layer contacting with the substrate comprises a titanium nitride film of 0.2 to 3 μ m in thickness having a granular structure.

9. A coated cutting tool according to any of Claims 5 through 8, wherein
15 the aluminum oxide layer comprises alpha aluminum oxide with a film thickness of 0.5 to 15 μ m.

10. A coated cutting tool according to any of Claims 1 through 9, wherein the substrate comprises cermet.